REMARKS/ARGUMENTS

This submission is being filed concurrently with a Request for Continued Examination (RCE), under 37 CFR § 1.116, in response to the final rejection of the Office Action dated April 5, 2010. In the most recent Office Action, independent Claim 1 and dependent Claims 2, 8-21, 23, 24, and 26-29 were rejected under 35 U.S.C. 103(a) as being unpatentable over PCT Document No. WO 01/78219 to Sadarangani, et al. ("*Sadarangani*") in view of newly cited U.S. Patent No. 6,043,572 to Nagai et al. ("*Nagai*"). With respect to independent Claim 1, which requires "magnetic fields of adjacent permanent-magnet members and their secondary magnets" that are "operable to mutually repel for essentially avoiding flux fringing in respect of the stator," the Office Action concedes that *Sadarangani* fails to disclose a secondary magnet but contends that *Nagai* teaches this feature. Furthermore, the Office Action claims that a person of ordinary skill would have found it obvious, based on *Nagai*, to modify the configuration disclosed in *Sadarangani* to achieve the configuration in Claim 1. (See Office Action, pages 3-4). However, Applicants respectfully disagree.

The newly cited *Nagai* reference is directed to a linear motor for use as a driving mechanism "for super-precise equipment, such as semiconductor manufacturing apparatuses, measurement devices and so forth." Column 1, lines 7-10. The main objective of the configuration in *Nagai* is to "cause the magnetic field to closely approximate a sine wave form even at the area near the end portion of the permanent magnets forming the linear motor." Column 1, lines 42-47. This sine wave form is approximated by way of using corrective permanent magnets 12A, 12B, 13A and 13B. Column 4, lines 56-60.

Contrary to the assertions in the most recent Office Action, Applicants submit that the combination of *Sadarangani* and *Nagai* fails to teach each and every element of Claim 1. In particular, as discussed in further detail below, Applicants respectfully submit that: (1) not only does *Nagai* fail to teach at least the feature of having "**magnetic fields of adjacent permanent-magnet members and their secondary magnets**" that are "**operable to mutually repel for essentially avoiding flux fringing in respect of the stator**," as required by Claim 1, but (2) it further would not have been obvious to modify *Sadarangani* with the teachings of *Nagai* to achieve the invention recited in Claim 1.

1. *Nagai* does not teach "magnetic fields of adjacent permanent-magnet members and their secondary magnets are operable to mutually repel for essentially avoiding flux fringing in respect of the stator," as required by Claim 1.

The Office Action, on pages 3-4, cites a description of *Nagai's* corrective magnets 12a, 12b, 13a and 13b (e.g., Column 8, lines 7-21) as teaching correction of leakage flux. However, unlike the secondary magnets recited in Claim 1, the function of the corrective magnets in *Nagai* is not to avoid flux fringing. Based on the placement of the corrective magnets in *Nagai* (i.e., at the end of the array, column 4, lines 56-60, and Figures 1 and 2) and the stated object of the invention (i.e., "to closely approximate a sine wave form even at the area near the end portion of the permanent magnets forming the linear motor," column 1, lines 42-47), it is clear that their purpose is not to prevent flux fringing but instead to more closely approximate a sine wave for the resultant magnetic field.

As such, the purpose of *Nagai's* corrective magnets is quite different from the function of the secondary magnets of the present invention. Indeed, the present invention is concerned with achieving an electrical machine of high power and torque density, and is therefore structured to avoid flux fringing. On the other hand, *Nagai* is concerned with precise positioning and therefore structures its magnetic field to create a sine wave for the magnetic flux.

Furthermore, the corrective magnets 12a, 12b, 13a and 13b of *Nagai*, which are cited as correcting leakage flux, should be distinguished from "magnets with the magnetic direction opposite that of the primary magnet (reference numeral 10b)," which the Office Action cites as teaching the secondary magnet in Claim 1. Regardless of whether the cited portion of *Nagai* does or does not teach using the corrective magnets 12a, 12b, 13a and 13b to avoid flux fringing, it certainly does not teach avoiding flux fringing with respect to element 10b. Likewise, Applicants submit that the same reasoning applied with respect to 10b would also apply to an arrangement having 10a as the primary magnet. Therefore, the structure of *Nagai's* magnetic field cannot be said to teach Claim 1's feature of being "operable to mutually repel for essentially avoiding flux fringing in respect of the stator."

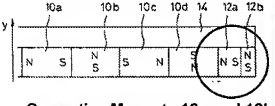
2. It would not have been obvious to modify the array in *Sadarangani* based on *Nagai* to achieve the claimed invention.

The Office Action contends that it would have been obvious to modify *Sadarangani* with the teachings of *Nagai* to "have the magnetic direction extend across the direction of the primary magnet for the secondary magnets of the intermediate member," as recited in Claim 1. In addition, the Office Action claims that the motivation to apply the teachings of *Nagai* to the invention in *Sadarangani* comes from the fact that the technique in *Nagai* is "used for correcting the leakage flux produced in the permanent magnet linear motor (see column 8, lines 7-21), the same field of endeavor as the claimed invention." (See Office Action, pages 3-4.) Applicants submit that the Office Action's characterization of *Nagai* is faulty, and therefore, that the conclusion of obviousness presented in the Office Action is in error as a matter of law.

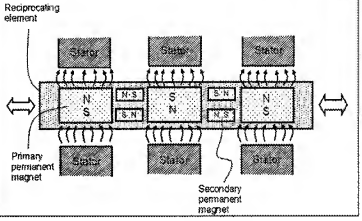
In particular, the most recent Office Action's claim that *Nagai* teaches correcting leakage flux is incorrect. As explained above, the technique described in *Nagai* is not for "avoiding flux fringing in respect of the stator," but rather for approximating the ends of a sine wave to achieve precise positioning. That is, contrary to the statement in the Office Action, the technique described in *Nagai* is not in the same field of endeavor as the claimed invention. Accordingly, there is no motivation to apply the teachings of *Nagai* to the invention in *Sadarangani*, and the Office Action does not otherwise provide any motivation to modify the invention in *Sadarangani* based on the teachings of *Nagai*. Even if *Nagai* did teach "wherein magnetic fields of adjacent permanent-magnet members and their secondary magnets are operable to mutually repel for essentially avoiding flux fringing in respect of the stator," it would not be an obvious modification to include the corrective magnets of *Nagai* along the length of the array in *Sadarangani*, as such a modification would be totally contrary to *Nagai's* purpose of forming a sine wave for the magnetic flux along the length of the array as discussed above. Without providing the requisite motivation to support the proposed modification of *Sadarangani*, the Office Action has failed to state a prima facie case of obviousness.

In addition, modification of *Sadarangani* based on the cited portion of *Nagai* would not achieve the features recited in Claim 1. Applicants note that, nowhere does the Office Action provide	Linear reciprocating machine according to an embodiment of the present invention

any support for motivation to modify *Sadarangani* based on the structure in *Nagai* with respect to element 10b, which the Office Action considers to teach the features of the secondary magnet. Instead, the support cited for such motivation (column 8, lines 7-21) refers to corrective magnets 12a, 12b, 13a and 13b. Linear machine according to *Nagai*



Corrective Magnets 12a and 12b



As illustrated in Figure 1, copied above, the configuration described in the cited portion of *Nagai* has a pair of corrective magnets (such as 12a and 12b above) at the end of an array of magnets. It does not teach the characteristics of the secondary magnets in Claim 1, wherein:

> adjacent permanent-magnet members of the movable element are separated from each other by an intermediate member comprising at least one secondary magnet which has a north pole and a south pole and a magnetic direction extending from the south pole to the north pole and essentially across the magnetic direction of the primary magnet, wherein magnetic fields of adjacent permanent-magnet members and their secondary magnets are operable to mutually repel for essentially avoiding flux fringing in respect of the stator.

Therefore, even if the motivation stated in the Office Action to modify *Sadarangani* based on the teachings of *Nagai* were sound, modification of *Sadarangani* based on the corrective magnets 12a, 12b, 13a and 13b would not achieve the feature of the secondary magnets as defined by Claim 1.

Alternatively, Applicants submit that, not only is there a lack of motivation in the prior art to include the element 10b of *Nagai* in the linear machine of *Sadarangani*, but such a combination would have been prohibited by *Sadarangani* itself. That is, the modification of *Sadarangani* based on the magnet 10b of *Nagai* would destroy the functioning of *Sadarangani*, or make it unsatisfactory for its intended purpose.

MPEP 2143.01 states that, "[i]f the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious." The principle of operation behind *Sadarangani's* particular arrangement is to permit mutually alternating primary magnets to be brought closer together, in order to provide "a high effect density with regard to the weight as well as the volume of the electrical machine." *Sadarangani*, page 4, lines 17-19. The close proximity of primary magnets results in a more rapid change of coupled flux as the reciprocating member moves, rendering the electromagnetic induction more efficient. *Sadarangani*, page 4, lines 12-16 and 19-20. Accordingly, it would be improper to separate the primary magnets in *Sadarangani* with the magnet 10b disclosed in *Nagai*, since the required modifications would be contrary to *Sadarangani*'s principle of having its alternating primary magnets in close proximity.

MPEP 2141.02(VI) requires consideration of prior art references in their entirety, *i.e.*, as a whole, including portions that would lead away from the claimed invention. Accordingly, particular consideration must be given to this disclosure in *Sadarangani*. *See W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540 (Fed. Cir. 1983). *Sadarangani* indicates to a person of ordinary skill in the art that its particular winding arrangement, which lacks secondary magnets, is key to obtaining high efficiency and compact implementation of the electrical machine. Because of the perceived disadvantage to the performance of the linear reciprocating machine, a person of ordinary skill would consider modifying the linear machine of *Sadarangani* to include secondary magnets a step backwards. The addition of mass to a linear reciprocating machine is known to increase vibrations and mechanical frictional losses, and is therefore disfavored by those skilled in the art. The addition of secondary magnets also reduces the active magnetic surface area of the reciprocating member, which also contributes to inefficiency in a linear machine. In addition, including additional secondary magnets in a reciprocating member

of a linear machine increases manufacturing costs, as it increases the number of components to assemble.

As discussed in Applicants' previous responses, the fact that the present invention achieves a net performance advantage despite the additional mass of the secondary magnets does not discount the reasoning against including secondary magnets described above, since the advantageous result was not predictable at the time of the invention. *See* MPEP 2143.02(II) (stating that a conclusion of nonobviousness can be supported by evidence showing there was no reasonable expectation of success at the time the invention was made). See *In re Rinehart*, 531 F.2d 1048 (CCPA 1976) and *Ex parte Erlich*, 3 USPQ2d 1011 (Bd. Pat. App. & Inter. 1986). With respect to the present invention, a person of ordinary skill in the art would not have had any reasonable expectation of success in adding secondary magnets to a linear reciprocating machine at the time of the invention. Therefore, the fact that the present invention, despite the lack of any reasonable expectation of success at the time of the invention, was able to achieve a net performance advantage by adding secondary magnets to its linear reciprocating machine, supports a conclusion of nonobviousness under MPEP 2143.02(II).

Applicants have made significant contributions to the art, which are neither taught nor suggested by the cited prior art, either alone or in combination. Inasmuch as at least the above-discussed feature of Claim 1 is clearly not taught or suggested by the combination of *Sadarangani* and *Nagai*, Applicants respectfully submit that Claim 1 patentably defines over the art of record and respectfully request the Examiner withdraw the current rejection under 35 U.S.C. § 103(a).

Dependent Claims 2, 8-21, 23-24 and 26-29

Claims 2, 8-21, 23, 24, and 26-29 depend from independent claim 1 and therefore include all of the features of amended claim 1, plus additional features that are not disclosed in the prior art. Accordingly, for this reasoning and for the reasons stated above, dependant claims 2, 8-21, 23, 24, and 26-29 are also patentable over the art of record.

Dependent Claims 3-7

In addition, Dependent Claims 3, 4, 6, and 7 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Sadarangani* and *Nagai*, in further view of U.S. Pat. No. 4,308,479 to Richter ("*Richter*"). Dependent Claim 5 was rejected under 35 U.S.C. § 103(a) as being unpatentable over *Sadarangani*, *Nagai*, and *Richter*, in further view of U.S. Pat. No. 6,211,593 to Nashiki ("*Nashiki*").

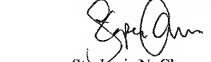
Since the patentability of independent Claim 1 has been argued as set forth above, Applicants will not take this opportunity to argue the merits of the rejection with regard to dependent Claims 3-7. However, Applicants do not concede that the dependent claims are not independently patentable and reserve the right to argue the patentability of the dependent claims at a later date if necessary.

CONCLUSION

In view of the remarks presented above, Applicants respectfully submit that all now pending claims are allowable and such favorable action is respectfully requested. Should the Examiner have any questions, comments or proposed claim amendments, he is encouraged to contact the undersigned so that allowance of this application can be expedited.

It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required therefore (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

Respectfully submitted,



Stephanie N. Chu
Registration No. 62,363

Customer No. 00826
ALSTON & BIRD LLP
Bank of America Plaza
101 South Tryon Street, Suite 4000
Charlotte, NC 28280-4000
Tel Atlanta Office (404) 881-7000

Fax Atlanta Office (404) 881-7777

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